

# COMPUTER PROGRAMS AND COPYRIGHT: THE SOUTH AFRICAN PERSPECTIVE

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## INTRODUCTION

Rarely has something so common been so misunderstood by so many. Computers and computer programs dominate our everyday existence in many ways. Computer programmes are clearly extremely valuable, primarily because of their utility, and there can be no doubt that the rights attaching to such programs are worthy of protection. Perhaps because of a lack of a better alternative<sup>1</sup> the international community<sup>2</sup> and the South African legal system<sup>3</sup> have chosen to protect the rights attaching to computer programs through copyright, a form of intellectual property that has been the subject of international agreement since the Berne Convention of 1886.<sup>4</sup> However, notwithstanding the familiarity of the courts with the legal mechanism of copyright and the ubiquity of computer programs in our society, the application of copyright protection to computer programs has proven to be a serious challenge to some of the best legal minds worldwide.<sup>5</sup>

This article proposes to analyse critically the South African legal position on the copyright protection of computer programs as set out in court

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<sup>1</sup> Several commentators argue that computer programs do not fit easily into the copyright scheme. A full discussion of this issue is, however, beyond the scope of this article. See for example John C Phillips 'Sui generis intellectual property protection for computer software' (1993) 60 *George Washington LR* 997; Sean E Gordon 'The very idea! Why copyright is an inappropriate way to protect computer programs' (1998) 20 *European Intellectual Property Review* 10; Henry Carr & Richard Arnold *Computer Software: Legal Protection in the United Kingdom* 2 ed (1992) 1. See also the dissenting opinion of Commissioner Hersey in the Final Report of the United States National Commission on New Technology Uses of Copyrighted Works of 31 July 1978 (CONTU Report) — available at <http://digital-law-online.info/CONTU/PDF/index.html> (last accessed on 20 April 2002).

<sup>2</sup> Article 10(1) of the Agreement on Trade-Related Aspects of Intellectual Property Rights 1994 (TRIPS Agreement)

<sup>3</sup> Section 2(1)(i) of the Copyright Act 98 of 1978 as amended (hereinafter 'the Copyright Act').

<sup>4</sup> Berne Convention for the Protection of Literary and Artistic Works 1886.

<sup>5</sup> For some general discussions on the application of copyright to computer programs see Susan A Dunn 'Defining the scope of copyright protection for computer software' (1986) 38 *Stanford LR* 497; Arthur R Miller 'Copyright protection for computer programs, databases, and computer generated works: Is anything new since CONTU?' (1993) 106 *Harvard LR* 978; Estelle Derclaye 'Software copyright protection: Can Europe learn from American case law? Part 1' (2000) 22 *European Intellectual Property Review* 7; and idem Part 2: (2000) 22 *European Intellectual Property Review* 56; and Daniel J M Attridge 'Copyright protection for computer programs' (2000) 22 *European Intellectual Property Review* 563; O H Dean 'Protection of computer programs by copyright in South Africa' (1995) 6 *Stellenbosch LR* 86.

decisions; to identify potential problems that have arisen; and to propose solutions to such problems by using appropriate international precedents. The classic dilemma of copyright law, in its attempt to provide an opportunity for compensation to creators of original works by granting them a limited monopoly in such works, while simultaneously trying not to stifle innovation and the creation of further works by others, is particularly visible in the area of computer programs and will be considered in the course of this contribution.<sup>6</sup>

## THE NATURE AND GENERAL ELIGIBILITY FOR COPYRIGHT OF COMPUTER PROGRAMS

The Copyright Act defines a computer program as being 'a set of instructions fixed or stored in any manner and which, when used directly or indirectly in a computer, directs its operation to bring about a result'.<sup>7</sup> This definition, although undoubtedly accurate, presents an incomplete picture of the operation of a computer program. Computer programs rarely function in isolation. Generally computer programs operate on specific input data to produce output data. The three different elements contributing to the operation of a computer program — the input data, the set of instructions and the output data — therefore have to be identified and, where possible, separated.<sup>8</sup>

Input data is the information that is entered into or accessed by a computer program and that is acted upon by the set of instructions contained in that computer program to produce a result. Input data takes on a wide variety of different forms and will only be protected by copyright if such data individually or collectively amounts to an eligible work or works under the Copyright Act.<sup>9</sup> Some input data may not qualify for copyright protection at all,<sup>10</sup> but an input data file may, for example, consist of a collection of written information and could thus be protectable as a literary work,<sup>11</sup> or may contain photographs, sketches or drawings, which are in themselves artistic

<sup>6</sup> The underlying philosophical purpose of intellectual property law is succinctly expressed by art 1 s 8 clause 8 of the Constitution of the United States of America which empowers Congress to 'promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their writings and discoveries'.

<sup>7</sup> Section 1, which closely resembles the definition in § 101 of the United States Copyright Act 1976, being 'a set of instructions to be used directly or indirectly in a computer in order to bring about a certain result'.

<sup>8</sup> The distinction may sometimes be difficult, for example, the sequencing of the user interface would be part of the computer program, but the visual arrangement thereof on the screen would rather be part of the output data.

<sup>9</sup> In particular in terms of s 2.

<sup>10</sup> For example, the mouse click commands of a user interacting with a computer program. See also *Data Access Corp v Powerflex Services (Pty) Ltd* [1999] HCA 49 where macro-command names were refused copyright protection, being single words or instructions.

<sup>11</sup> Section 1(g) of the definition of a literary work in the Copyright Act includes 'tables and compilations of data stored or embodied in a computer or a medium used in conjunction with a computer'. It should be noted that this definition incorrectly presupposes all data to be literary in nature. See for example *Haupt v Brewers Marketing Intelligence (Pty) Ltd* (as yet unreported SCA case no 118/05 decided on 29 March 2006) and *Econostat (Pty) Ltd v Lambrecht* 89 JOC (W).

works.<sup>12</sup> An input data file may even contain a film or sound recording that is clearly protected by copyright together with any underlying literary or musical works. Regarding input data, an interesting point to note is that the arrangement of the input data file must be fixed so as to allow the computer program correctly to interoperate with it.<sup>13</sup> Any competitive program wishing to make use of such existing data files must therefore make use of the same data file arrangement and will not be able to do so if prevented by copyright.

The computer program causes the computer to perform operations on the input data in order to produce output data.<sup>14</sup> The computer program is thus merely the set of instructions referred to in the definition in the Copyright Act and no more.<sup>15</sup> It is not, and should not encompass, the input data or the output data.<sup>16</sup> These instructions are generally written by computer programmers in language understandable to humans, often referred to as source code. When completed, the source code program is compiled or assembled into object code or machine code, which is understandable to a computer.<sup>17</sup> Fundamentally, the act of compilation does not change the instructions to the computer at all. It merely serves to translate the coded instructions from one computer language to another. The object code can also be decompiled or disassembled to reveal the original source code. Object code is thus merely an adaptation of source code in terms of the Copyright Act.<sup>18</sup> Both the source code and the object code fall within the Copyright Act's definition of a computer program.<sup>19</sup> Furthermore, it is clear that computer code does not have to be ready for commercial exploitation in order to qualify for protection as a computer program under the Copyright

<sup>12</sup> See the definition of artistic work in s 1(a) of the Copyright Act. This would typically be the case in a video game. See for example *Nintendo Co Ltd v Golden China TV Game Centre* supra note 12.

<sup>13</sup> This involves the ability of the computer program to correctly read and write information from and to the data file. See *Total Information Processing Systems Ltd v Daman Ltd* [1992] FSR 171 at 177–8.

<sup>14</sup> See Kai Tumbragel & Roux de Villiers 'Copyright protection for the non-literal elements of a computer program' (2004) 10 *Computer and Telecommunications LR* 34 at 38. A suite or package of programs interacting with each other could also be used. Under English law such a suite or package of programs could even be protected as a compilation in itself if original (see *IBCO Computers Ltd v Barclays Mercantile Highland Finance Ltd* [1994] FSR 275 (ChD) at 290).

<sup>15</sup> For an interpretation of the words 'set of instructions' see *Data Access Corp v Powerflex Services (Pty) Ltd* supra note 10, in which the High Court of Australia holds that a reserved word or macro command name is not by itself such a set of instructions, nor the collocation of such macro command names.

<sup>16</sup> See O H Dean *Handbook of South African Copyright Law* (1998) 1–11. The exception is when input data forms part of the coding of the program itself, in which event such data cannot constitute a separate work for copyright purposes, but forms a part, and even a substantial part, of the program. See Gaudron J in *Data Access Corp v Powerflex Services (Pty) Ltd* supra note 10 at 127.

<sup>17</sup> Some programmers are actually able to program directly in object code, but they are the exception rather than the rule.

<sup>18</sup> Subsection (d)(i) of the definition of adaptation in s 1 includes for a computer program 'a version of the program in a programming language, code or notation different from that of the program'. See also *Apple Computer v Rosy t/a SA Commodity Brokers (Pty) Ltd* 134 JOC (D) at 135 and *Apple Computer Inc v Computer Edge (Pty) Ltd* [1984] FSR 481 (Fed Ct Aus) and *Computer Edge (Pty) Ltd v Apple Computer Inc* [1986] FSR 537 (HC of Aus).

<sup>19</sup> *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* 2005 (1) SA 398 (C) at 410.

Act, but that a development stage of the program code can also qualify for such protection.<sup>20</sup>

The output data is 'the result' referred to in the definition of a computer program. This result is the end product of the execution of the computer program's instructions by the computer hardware. As is the case in regard to the input data, the output data can take a variety of forms. The output data will typically include a screen layout or design, which may be an artistic or literary work in itself.<sup>21</sup> In some cases the output data may be a copyright work or amount to the performance of a copyright work.<sup>22</sup> The output data may even be used to alter the input data of the computer program and thus to create derivative copyright works. Obviously the output data will not necessarily attract copyright at all, but will do so if, and only if, it is in itself an eligible work in terms of the Copyright Act.<sup>23</sup> Regarding output data it is important to note that it requires time and effort for computer users to familiarize themselves with a user interface, including in particular its output screens and command structure. Such time and effort obviously involve cost considerations for computer users, making it difficult for computer users to change to another computer program with a different user interface.<sup>24</sup>

Unfortunately, these three elements, namely the input data, the computer program and the output data, are sometimes lumped together as all being part of the same work or not properly separated in all respects.<sup>25</sup> Although this approach may appear practically more convenient, it tends to lead to confusing results in law.<sup>26</sup> Strictly speaking, eligibility for copyright

<sup>20</sup> Streicher JA in *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 para 23 rejects an assertion to the contrary as follows: 'A computer program is defined in s 1 of the Act as "a set of instructions fixed or stored in any manner and which, when used directly or indirectly in a computer, directs its operation to bring about a result". It does not require the result to be correct.' In this regard the view of Dean op cit note 16 at 1–13 that only the final stage of the development process constitutes a computer program falls to be rejected. See also *Sweeney v Macmillan Publishers Ltd* 2002 RPC 35 (ChD) for the protection of the development stages of a literary work.

<sup>21</sup> *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd* (1991) 399 JOC (T) 408–10, *Computer Associates International Inc v Altai Inc* 982 F 2d 693.

<sup>22</sup> See for example *Nintendo Co Ltd v Golden China TV Game Centre* supra note 12 and *Golden China TV Game Centre v Nintendo Co Ltd* 1997 (1) SA 407 (A), where the output data amounts to the performance of a cinematograph film.

<sup>23</sup> In particular it has to comply with s 2. See *Sure Travel Ltd v Excel Travel (Pty) Ltd* (as yet unreported WLD case no 22489/04 decided on 19 November 2004).

<sup>24</sup> See for example *Lotus Development Corp v Borland International Inc* 49 F3d 807; *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd* supra note 21.

<sup>25</sup> The decision of Streicher JA in *Haupt v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 is a notable exception and must be commended.

<sup>26</sup> See *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd* supra note 21 at 408–10 in which it was stated that the output screens were literary works, but also that they were protected as part of the computer program and, consequently, the court held that a separate computer program that produced similar output screens was an amendment of the original program and infringed the copyright therein, even though no reproduction of the underlying code was alleged. This is a misconception. The output screens may be literary or artistic works in themselves, but they do not form part of the instructions for the computer. They are merely the result emanating from such instructions. The fact that a program produces output screens which substantially reproduces and infringes the original screens of another program does therefore not mean that the underlying program itself is infringed. See also *Northern Office Micro Computers (Pty) Ltd v Rosenstein* 1981 (4) SA 123 (C) where it was held that a computer program that produces multiplication tables or the alphabet will be too trivial to protect under copyright. Strictly speaking this approach

protection, copyright ownership and infringement for each element should be evaluated independently, because each element may represent an entirely different work.<sup>27</sup>

This approach should not change merely because two or more of the different elements are stored together on the same device.<sup>28</sup> The method or period of storage or presentation of a computer program, input data or output data or the fact that a work in digital form is ephemeral<sup>29</sup> should not affect eligibility for copyright in any way, provided that the works are all in material form, which will be so if the expression contained in the work can be reproduced as such.<sup>30</sup>

A fourth element that may acquire separate copyright protection is the preparatory materials created in the course of designing a computer program. These materials could include written instructions, flowcharts, user interface designs etc. Clearly these materials do not meet with the definition of a computer program, but often deserve to be protected by copyright nonetheless, normally as literary or artistic works.<sup>31</sup>

incorrectly prejudices the content and complexity of a computer program based on the output data it produces. See also *Broderbund Software Inc v Unison World Inc* (1986) 648 F Supp 1127. Finally see *Nintendo Co Ltd v Golden China TV Game Centre* supra note 12 and *Golden China TV Game Centre v Nintendo Co Ltd* supra note 22, both of which held that a video game amounts to a cinematograph film. The input data image files fixed on the CH-ROM chip may well fall within the definition of a cinematograph film since such image files amount to a fixation of images capable of being seen as a moving picture when used with a computer. Nevertheless, the set of instructions to the computer on the P-ROM chip that enabled the images to be so viewed would be a distinct and separate work and should be protected as a computer program, since it is in fact part of the electronic device that enables the images to be seen as a moving picture.

<sup>27</sup> In *Haupt v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 Streicher JA expressly criticizes the court a quo for failing to draw the necessary distinctions and then proceeds to distinguish explicitly between the different databases and computer program modules forming part of the end product and evaluating originality, authorship and ownership for them separately.

<sup>28</sup> See *Computer Edge (Pty) Ltd v Apple Computer Inc* supra note 18, where the Australian High Court held that a program stored as electrical impulses on ROM chip was not an eligible work at all. This was rejected by the Supreme Court of Canada in *Apple Computer Inc v Mackintosh Computers Ltd* [1990] 2 SCR 209 and later overruled by *Autodesk Inc v Dyason* [1992] RPC 575 (HC of Aus).

<sup>29</sup> For example, the layout of output data on a computer screen as argued in *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd* supra note 21.

<sup>30</sup> Section 2(2) of the Copyright Act includes representation in digital data or signals. See *Northern Office Micro Computers (Pty) Ltd v Rosenstein* supra note 26 where the program was stored on a floppy disc and *Golden China TV Game Centre v Nintendo Co Ltd* supra note 22 where the input data and program were stored on ROM chips. See also *Metix (UK) Ltd v GH Maughan (Plastics) Ltd* [1997] FSR 718 (Pat Ct).

<sup>31</sup> *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19 at 410; Tana Pistorius & Coenraad Visser 'The Copyright Amendment Act 125 of 1992 and computer programs: A preliminary overview' (1992) 4 *SA Mercantile LJ* 346 at 348, Dana van der Merwe 'Copyright and computers, with special reference to the internet' (1998) 115 *SALJ* 180 at 191; Dean op cit note 16 at 1–14. Contrast *Payen Components SA Ltd v Bovis Gaskets CC* 1994 (2) SA 464 (W) at 472 which held that the 'table of significance' used to develop the computer program that was in turn used to generate the list of gasket numbers 'cannot constitute a work since it was merely the outline of a new system, based on certain mathematical principles, which was used . . . for devising a computer program'. This approach is clearly incorrect. Any material can attract copyright in its own right, provided it meets all the eligibility criteria — in this case as a literary work. Such copyright, once attained, cannot be lost simply because further development occurs. See *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19, which held that a developmental version of a program of which the core functionality was complete was protectable by copyright even though not commercially available. See also *Biotech Laboratories (Pty) Ltd v Beecham Group* 2002 (4) SA 248 (SCA) at 262.

## AUTHORSHIP

The Copyright Act defines the author of a computer program as being 'the person who exercised control over the making of the computer program'.<sup>32</sup> The protection of computer programs as sui generis works is unique to South Africa and this definition is similarly unique. The interpretation of the definition is crucial, since it will often determine the ownership of copyright in a computer program. Three possible situations can be identified: a programmer writes a program while not being under any obligation to a third party to do so; a programmer writes a program in fulfilment of his or her obligations under an employment contract (*locatio conductio operarum*); or a programmer writes a program in fulfilment of his or her obligations to do so under a commission or contract for work (*locatio conductio operis*).

In the first situation, where the programmer is under no obligation to write the program, the programmer is apparently in control of the making of the program and will be the author thereof as well as the first copyright owner.<sup>33</sup> In the second situation, where the programmer is employed, it is generally not decisive who the author of the program is,<sup>34</sup> because the first ownership of copyright in the work will tend to vest in the employer of the programmer irrespective of who the author is.<sup>35</sup> It is extremely likely that in most cases the employer will, in any event, be the author of the program, since it would be exercising 'control' over the employee's actions as part of the employment relationship.<sup>36</sup> The real problem arises in the third situation, where the programmer is commissioned to write the program, which also happens to be the situation that occurs most often in practice.<sup>37</sup>

The Copyright Act does not make provision for the automatic *ex lege* transfer of first ownership of copyright in a computer program from the author to the commissioning party.<sup>38</sup> Furthermore, it is quite common for such commissions to be oral in nature rather than written and, even where

<sup>32</sup> Subsection (i) of the definition of 'author' in s 1.

<sup>33</sup> In terms of s 21(1)(a) of the Copyright Act.

<sup>34</sup> Except for the purposes of asserting moral rights in terms of s 20 of the Copyright Act.

<sup>35</sup> If the employer is the author, the employer obtains copyright by way of s 21(1)(a) of the Copyright Act, and if the employee is the author, the employer obtains copyright by way of s 21(1)(d). The only exception is the vesting of copyright in accordance with an agreement made in terms of s 21(1)(e). See for example *Prism Holdings Ltd v Liversage* 2001 BIP 114 (W) 118.

<sup>36</sup> See *Haupt t/a Sofitcopy v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 para 41, which states that "control" in the definition [of author in respect of a computer program], must therefore have been intended to have a wider meaning than "control" in the employment situation". By these words Streicher JA seems to imply that the control exercised by way of the employment contract will ordinarily be adequate to vest authorship in the employer.

<sup>37</sup> The scenario can occur in several different guises, for example, where a programmer forms part of a team of independent programmers working together on the development of a computer program, or where programmers or the businesses employing the programmers are instructed by a third party to develop a computer program.

<sup>38</sup> Computer programs are not named in the list of works in s 21(1)(c) of the Copyright Act in respect of which such transfer can occur, and following cases such as *Marais v Bezuidenhout* 1999 (3) SA 988 (W) and *Nel v Ladismith Co-Operative Wine Makers and Distillers Ltd* [2000] 3 All SA 367 (C) it is clear that s 21(1)(d) can be used only for an employment contract. Ironically, cinematograph films are listed in s 21(1)(c) and could thus apply at least to the input files to video games after the decision in *Golden China TV Game Centre v Nintendo Co Ltd* supra note 22.

the commission is in writing, there is often no contractual clause regulating the vesting of copyright in the commissioned computer program.<sup>39</sup> This means that the commissioning party will have to rely on the definition of authorship to obtain initial copyright ownership in computer programs that it has commissioned.<sup>40</sup>

It was commonly believed that the words 'control over the making' would be interpreted by the courts in a similar way to the words used to identify the author of a computer-generated work, cinematograph film or sound recording. In those cases the author is the person who makes or undertakes the arrangements necessary for the making of such a work.<sup>41</sup> This approach would mean that the person undertaking and controlling the physical arrangements (as opposed to the mere financial arrangements) for the making of the computer program would qualify as the author.<sup>42</sup> Such physical arrangements could include obtaining assistance for the development of parts of the final work from third parties.<sup>43</sup> Control over the physical making of the program would thus be the key to authorship under this approach, with less emphasis on financial control. It is thus likely that someone who commissions a computer program ('the commissioner') will find it difficult to qualify as the author of that program, unless he does more than merely commissioning the work and paying for it.

Here it is worth noting that the usual role of the commissioner in a software development contract is to supply the computer programmer or software house with a functional specification outlining the functionality that it requires from the software. During development of the programs the commissioner would typically have meetings with the software developers to monitor their progress against a project schedule and to suggest changes to the functionality and user interfaces of the programs as they are being developed. The question therefore becomes whether or not this type of

<sup>39</sup> Transfer of copyright ownership must be in writing and signed by the assignor or licensor in terms of s 22(3) of the Copyright Act. In this regard the proposition that copyright ownership can transfer to someone who commissions a work by way of an oral or even tacit agreement in terms of s 21(1)(e) of the Copyright Act must be rejected (see for example *Freefall Trading 211 (Pty) Ltd v PropLink Publishing (Pty) Ltd* 2005 (as yet unreported CPD case no 10491/05 decided on 29 November 2005) paras 15 and 16. Section 21(1)(e) clearly states that ss 21(1)(b), (c) and (d) 'shall in any particular case have effect subject to any agreement excluding the operation thereof'. The only effect s 21(1) (e) thus foresees is the exclusion by an oral or tacit agreement of the effect of s 21(1)(b), (c) or (d) which transfer initial ownership of a copyright work to someone other than the author thereof (as prescribed by s 21(1)(a)). In this regard it should be noted that the operation of s 21(1)(a) cannot be excluded by such a tacit or oral agreement in terms of s 21(1)(e).

<sup>40</sup> See for example *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19.

<sup>41</sup> Dean op cit note 5 at 89.

<sup>42</sup> See *Nintendo v Golden China TV Game Centre Co Ltd* supra note 12 at 242–3 from which it is clear that the party making the physical arrangements is recognized as the author of a cinematograph film. See also *Bangboye v Reed* [2004] EMLR 5 (QB) which determines the author by asking who the 'moving force' was behind the physical arrangements. See also *Beggars Banquet Records Ltd v Carlton Television Ltd* [1993] EMLR 349 (ChD) and *A&M Records Ltd v Video Collection International Ltd* [1995] EMLR 25 (ChD) for a different perspective, where the financial arrangements made for the commissioning of a work, and in particular the payment of production costs, was considered sufficient for the vesting of authorship. In this regard it should be noted that the English Copyright, Designs and Patents Act 1988 has no provision similar to s 21(1)(c) of the South African Copyright Act and such absence apparently influenced these decisions.

<sup>43</sup> *Nintendo v Golden China TV Game Centre Co Ltd* supra note 12 at 242.



contribution by the commissioner is sufficient to make it the author or co-author of the final computer program.

It is clear that the commissioner's intellectual input into the final work is generally extremely limited. The functional requirements could be compared to a statement of requirements to an architect in which the commissioner determines what type of rooms it requires in a house that it wants the architect to design. Such contributions will ordinarily be considered general ideas and would thus not vest authorship in the commissioner if the work in question was a musical, literary or artistic work.<sup>44</sup> However, South Africa has chosen to protect computer programs as a *sui generis* entrepreneurial work. Intellectual input is not a requirement for authorship — control is.<sup>45</sup> The amount of control that a commissioner exercises over the making of a computer program will be a question of fact in each case. Clearly the commissioner will be the ultimate 'moving force'<sup>46</sup> behind the making of the program, but, as indicated, it is generally not such a force in a physical sense, but rather in a financial sense. Control over the physical writing process is mostly left to the programmer or manager of the development team, subject to periodic review of their progress by the commissioner. This approach would tend to suggest that the programmers or software development house will, consistent with long held beliefs in the software industry, be considered the author of the program.<sup>47</sup>

In *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd*<sup>48</sup> the test for control was, however, set out by Erasmus J as follows:

'[T]he person who exercises control over the making of a computer program is a person who has the power of regulation of the manner in which the person who "makes" the program is to do his or her work. "Control" in this context does not, in my view, mean that the person who exercises control must be able to instruct the programmer as to technical detail. Control means *setting the purpose and requirements* that that the program to be made must satisfy, and *evaluating* the work of the person that "makes" the program to ensure that the requirements are met and that the program is functional and capable of fulfilling the stated purpose.'<sup>49</sup>

Erasmus J then proceeds to find that the commissioning company through its employees were in control of the making of the computer program developed by the commissioned programmer, since they provided the functional requirements and periodically reviewed his progress.<sup>50</sup> This approach by Erasmus J can be considered revolutionary. If accepted, it

<sup>44</sup> See for example *Pan African Engineers v Hydro Tube* 1972 (1) SA 470 (W) which held that the contributor of ideas was not a co-author.

<sup>45</sup> *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) *supra* note 19 at 412.

<sup>46</sup> *Bamgboye v Reed* [2004] EMLR 5 (QB).

<sup>47</sup> See for example *Logistics Network (Pty) Ltd v Hard & Software Systems CC* 1999 BIP 278 (C) where a commissioner's claim to authorship in respect of a computer program was refused, consistent with industry practice. See also the allegations of the respondent computer programmers repeated by Schreuder AJ in *Lacfin (Pty) Ltd v Le Roux* 769 JOC (O) at 774–5 and the decision in *Fylde Microsystems Ltd v Key Radio Systems Ltd* [1998] FSR 449.

<sup>48</sup> *Supra* note 19.

<sup>49</sup> At 416 (emphasis added).

<sup>50</sup> Interestingly, Erasmus J seemingly fails to apply his own test later on in the judgment at 420 when deciding on authorship in the software after further development post 1 July 1998, but instead refers to English authority where the definition of authorship is clearly different since computer programs are viewed as literary works.



effectively transfers ownership in a vast number of computer programs developed in this country. The consequence will be the invalidation of existing licences granted in the belief of copyright ownership and large-scale infringement of intellectual property rights. In addition, the treatment of customized versions of standard computer programs that are created by a developer based on each customer's specific requirements will become a copyright nightmare if not regulated by written agreement. The developer will clearly own the copyright in the original standardized version of the program, but according to the approach of Erasmus J each customer could potentially be author of its own derivative customized version of the program and thus own the copyright therein. Potentially each customer can thus start competing with the software developer, unless it is contractually prevented from doing so. The result of the approach by Erasmus J can thus only be described as a commercial disaster and cannot be recommended.

Streicher JA in *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* does not expressly reject the approach of Erasmus J, but instead defines 'to control' and 'control' by referring to the Shorter Oxford Dictionary as meaning 'to exercise restraint or direction upon the free action of' and 'the fact of controlling, or checking and directing action'.<sup>51</sup> Streicher JA then evaluates the relationship between the commissioner and the contractor as follows in order to establish whether the requisite 'control' was exercised by the commissioner:

'In this case Haupt instructed Coetzee as to the end result that was to be achieved, Coetzee then did the technical work required to achieve that end result and from time to time effected improvements. However, Coetzee was all along in *constant contact* with Haupt and he *accepted and executed detailed instructions* from Haupt. *As he progressed he submitted his work* to Haupt for it to be *checked and approved* by him. In the properties section of the Data Explorer program Coetzee indicated that the copyright was owned by Softcopy, the name under which Haupt was trading. The allegation by Haupt in his founding affidavit that it was always agreed between the parties that Haupt was the owner of the program was not disputed. This being the understanding between the parties, Haupt could at any time direct in which direction the development of the program should proceed or could terminate further development if he wished to do so. Haupt was, therefore, in a *position of authority* over Coetzee insofar as the *development* of the program was concerned. He was in command and Coetzee subjected himself to such command. It is true that Haupt was in *no position to instruct* Coetzee as to how, *technically*, to achieve his requirements but I agree with the High Court that one does not need to be a computer programmer to be able to control the writing of a computer program. For these reasons I am of the view that Haupt controlled the writing of the computer programs written after 31 July 1998.'<sup>52</sup>

It seems clear from these words of Streicher JA that a commissioner will not be seen to be in 'control' by merely instructing a contractor as to the end result required from it and then evaluating such end result to see whether or not its requirements have been met. The judgment appears to require considerably more — namely an element of control over the actual physical arrangements for the writing of the program by the programmer. The continuous involvement of the commissioner in the development process, the detailed instructions given by the commissioner as to the writing of the

<sup>51</sup> Para 41.

<sup>52</sup> *Ibid* (my emphasis).

program and the position of authority of the commissioner with regard to the development process are emphasized by Streicher JA and all point towards such an approach.

The decision of Streicher JA should be welcomed. As stated above, the mere provision of functional requirements, periodic reviewing of the progress made by the developers, and testing of the final program to evaluate whether the requirements have been met, without more, should be insufficient to establish control over the making of the program or to vest authorship therein. As stated by Streicher JA, the commissioner does not have to give detailed technical instructions to establish the requisite 'control', but it seems clear that at least some form of control over the physical arrangements for the actual technical development and writing of the program will be required.

### ORIGINALITY

Computer programs have to be original to qualify for copyright protection.<sup>53</sup> It is trite law that originality requires the expenditure of individual intellectual effort in the form of labour, skill or judgement and that the work must be more than a mere slavish copy.<sup>54</sup> Provided such effort is expended, however, it is quite possible to create original derivative works that make use of existing material, including existing copyright works.<sup>55</sup> The Copyright Act even makes it clear that infringement of an existing work by a second work does not as such prevent such second work from being original.<sup>56</sup>

Generally computer programs have little problem in being recognized as original, because of the effort expended in creating them. It can be argued that such effort should relate to the control over the making of the program, since it is such control that vests authorship, in which case very little effort will be required for originality.<sup>57</sup> However, the courts seem to follow the traditional approach. Erasmus J in *Haupt*<sup>58</sup> states it as follows: 'The originality of a computer program, and its eligibility for copyright, would therefore depend upon the question whether sufficient original skill and labour were used in the creation of the program.'<sup>59</sup>

<sup>53</sup> Section 2(1) of the Copyright Act.

<sup>54</sup> *Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* 1987 (2) SA 1 (A).

<sup>55</sup> *Ibid.*

<sup>56</sup> Section 2(3).

<sup>57</sup> The definition of the author of a computer program is significant. Whereas the author of a literary work is the person who 'makes or creates' the work, the author of a computer program is the person who 'exercised control over the making' thereof. As stated by Dean op cit note 16 at 1–22, 'the author or maker of a work is the cornerstone of copyright law'. It is thus arguable that the definition of an 'author' gives an indication of the type of effort that is protectable by copyright depending on the nature of the work, because it defines the type of effort in each case that vests authorship. For a literary work, the effort spent in creating or making the work can thus be argued to be protectable, whereas for a computer program the effort spent in controlling the making of the program is arguably the effort worth protecting. A full discussion of this argument is, however, beyond the scope of this article.

<sup>58</sup> *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19 at 412. See also *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 paras 35 and 36.

<sup>59</sup> See also *Lacfin (Pty) Ltd v Le Roux* supra note 47 at 778–9.

A modified version of a computer program is nothing but a derivative version thereof that should of itself be original, provided it is to an extent the product of the author's own labour, skill or judgement.<sup>60</sup> The following statement by Erasmus J in *Haupt*<sup>61</sup> should therefore be approached with caution:

'The applicant may have expended time, effort, skill and expense on improving and refining the software. It is, however, necessary to have regard to what the time and effort was expended on. The time and effort was devoted to making changes to a program, the copyright of which at all times vested in the first respondent. By expending time and effort on the improvement of the program, the applicant did not, in some way, become the holder of the copyright.'<sup>62</sup>

While the statement is entirely true in respect of the unmodified initial version of the computer program, the same cannot be said for the modified version of the program that is created as a result of the changes.<sup>63</sup> It is apparent that the applicant's creation of such a derivative computer program in this case may well have amounted to an infringement of the copyright held by the respondent, but, as indicated above,<sup>64</sup> such infringement is irrelevant in determining whether or not the derivative program is in fact original. In reality, the type of effort expended by the applicant appears to be exactly the type that would create an original computer program, provided sufficient skill, labour and judgement was expended in making the modifications.<sup>65</sup> Erasmus J attempts to clarify his statement when he continues:

'It is not the applicant's case that one (or more) of the developments that occurred after 31 July 1998, and of which he was author, satisfied the originality requirement of the Act and attracted copyright in its own right. . . . The applicant's case is simply that he (applicant) is the holder of the copyright in the converter program as part of the Data Explorer "package".'<sup>66</sup>

The Supreme Court of Appeal found that Erasmus J erred when making this statement.<sup>67</sup> In this regard it should also be remembered that the originality of a work should be judged by reference to the whole of the work and not by reference to its separate parts, although some parts of the work will contribute more to the originality of the work as a whole (eg the newly created parts) than other parts (eg the previously existing, copied or

<sup>60</sup> *Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* supra note 54. See also *Northern Office Micro Computers (Pty) Ltd v Rosenstein* supra note 26, which states that the application of the effort and skill must give the work a 'new and original character'. New in this respect should not be interpreted as absolute novelty as is required to make an invention patentable, but merely as being different from the original character.

<sup>61</sup> *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd (C)* supra note 19.

<sup>62</sup> At 419. In contrast, Erasmus J, in a later part of his judgment, at 422–3, stated that the computer program was not protected by the Copyright Act at all and in fact fell into the public domain allowing anyone to copy it. This apparently conflicting finding is frankly incomprehensible. There is no doubt that the computer program was eligible for copyright. It was only the authorship and ownership thereof that were ever really in dispute and these aspects were settled in favour of the respondent by Erasmus J. The fact that the respondent owned the copyright and not the applicant simply cannot mean that the work is not protected by the Copyright Act at all. It simply means that the respondent is entitled to the copyright protection that the applicant was wrongly claiming for himself.

<sup>63</sup> Note that the respondent no longer exercised any form of control over the applicant during the making of the modified version.

<sup>64</sup> In section II (3).

<sup>65</sup> In *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd (SCA)* supra note 11 para 24 Streicher JA expressly rejects the approach by Erasmus J and finds the final computer program to be original at 36. Also see *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14 at 293–4.

<sup>66</sup> At 419.

<sup>67</sup> Per Streicher JA in *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd (SCA)* supra note 11 para 25.

commonplace parts).<sup>68</sup> Unless the converter program was argued to be an entirely separate copyright work from the remainder of the Data Explorer package,<sup>69</sup> it was not possible for the applicant to claim that he was holder of the copyright in the derivative work, since the whole thereof can be original provided sufficient protectable effort has been spent on modifying it.<sup>70</sup> It would not have been proper to claim originality in parts of the derivative work only. The applicant consequently simply had to allege facts from which a conclusion could be drawn that his effort in changing the program was sufficient for the changed version to be original and that he was the owner of copyright in such derivative program.<sup>71</sup>

## INFRINGEMENT

South Africa is in the unique position that, contrary to the express requirements of the TRIPS Agreement,<sup>72</sup> it has chosen to protect computer programs as a *sui generis* work rather than a literary work. It is thus important to keep in mind that the South African legislature has clearly recognized that different considerations apply to computer programs than to literary works.<sup>73</sup> Nonetheless, prior to the Copyright Amendment Act 1992, South Africa was one of the first countries in the world to protect computer programs as literary works and case law dealing with literary works thus remain of some import to computer programs.<sup>74</sup>

### *Scope of protection*

The specific exclusive rights granted to the holder of copyright in a computer program are listed in the Copyright Act<sup>75</sup> and include exclusive reproduction and adaptation rights.<sup>76</sup> The limitations on these exclusive rights are contained in the exceptions to infringement in the Copyright

<sup>68</sup> See *Biotech Laboratories (Pty) Ltd v Beecham Group* supra 257 stating: 'Under the Act the inquiry is whether the "work" . . . was original. The inquiry is not whether its parts are original.' See also the submissions of Dean op cit note 16 at 1–16.

<sup>69</sup> The court, however, did not separate the components of the Data Explorer package into separate programs, but instead treated the package as a single copyright work. If the converter program had been dealt with as a separate work, it would be entirely correct to state that the creation of a new work does not transfer copyright in another already existing work.

<sup>70</sup> The converter program was in fact one of the modifications made after 31 July 1998.

<sup>71</sup> *Video Rent (Pty) Ltd v Flamingo Film Hire* 1981 (3) SA 42 (C). It could be argued that the applicant's problems did not arise from a lack of originality or ownership of the Data Explorer program, but rather from the fact that the respondent did not copy any part of the Data Explorer program that vested such originality in the applicant (being the changes made after 31 July 1998), since the respondent only copied those parts of the program which were developed by the applicant while employed by the respondent (the so-called Project AMPS prototype program as at 31 July 1998) and in respect of which the respondent thus in fact held the copyright in terms of the decision.

<sup>72</sup> Article 10(1) of the Agreement on Trade-Related Aspects of Intellectual Property Rights 1994 (TRIPS Agreement).

<sup>73</sup> A full discussion of the merits of this approach unfortunately falls outside the scope of this article.

<sup>74</sup> *Northern Office Micro Computers (Pty) Ltd v Rosenstein* supra note 26 and *Econostat (Pty) Ltd v Lambrecht* supra note 11.

<sup>75</sup> Section 11B. See also s 23(2) and s 27 for secondary infringement and criminal infringement.

<sup>76</sup> Section 1 states that 'adaptation' includes a version of the program in a different programming language, notation or code. This would include the source code version of a program in object code.

Act.<sup>77</sup> In addition, the Copyright Act provides that any reference in it to the doing of an act in relation to a work has to be construed as a reference to the doing of an act in relation to a substantial part of such work.<sup>78</sup> Between them these provisions define the most important parts of the scope of copyright protection for computer programs.

The very limited technical copyright exceptions in s 19B(2) of the Copyright Act stand in stark contrast to ss 50A, 50B, 50BA and 50C read with s 296A of the English Copyright, Designs and Patents Act 1988.<sup>79</sup> Section 19B(2) allows the making of back-up copies for private and personal purposes only, whereas s 50A has no such limitation. In addition, s 50C allows changes for the purposes of error correction, s 50B allows decompilation for the purposes of interoperability<sup>80</sup> and s 50BA allows the reverse engineering of a computer program.<sup>81</sup> Section 296A makes any contractual term void that seeks to avoid the operation of ss 50A, 50B or 50BA. These additional exceptions in the English Act are clearly designed to stimulate competition and further development and to prevent unwarranted monopolies.<sup>82</sup> The United States courts have used the flexible 'fair use' exemption<sup>83</sup> to similar effect, but go even further by allowing decompilation for the purposes of understanding the ideas and functional elements contained in the program by holding 'where disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law'.<sup>84</sup>

The English, European and United States approach to the copyright exemptions thus all show a tendency to limit the scope of protection for computer programs, because they recognize that computer programs are essentially utilitarian or functional in nature as opposed to most other copyright works.<sup>85</sup> The granting of a monopoly for a computer program will therefore have more far reaching effects than for most other copyright works.

<sup>77</sup> Section 19B.

<sup>78</sup> Section 1(2A).

<sup>79</sup> See also ss 47B, 47C, 47D, 47E, 47F read with s 47H in the Australian Copyright Act 1968.

<sup>80</sup> See *Mars UK Ltd v Teknowledge Ltd* [2000] ECDR 99 which declined to extend the defence to decompilation for the purposes of repair or error correction.

<sup>81</sup> Reverse engineering generally refers to a 'black box' method of establishing the inner functioning of a computer program without actually investigating the program code, by simply analysing the output data of the computer program.

<sup>82</sup> See also arts 5 and 6 of Council Directive (EEC) No 91/250 of 14 May 1991 on the legal protection of computer programs.

<sup>83</sup> The fair use defence is found in 17 USC § 107 which reads as follows: '[T]he fair use of a copyrighted work . . . is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.'

<sup>84</sup> *Sony Computer Entertainment v Connectix Corp* 203 F 3d 596 (9th Cir 2000) and *Sega Enterprises Ltd v Accolade Inc* 977 F 2d 1514 (9th Cir 1993) 1527–8.

<sup>85</sup> The exception would be the copyright protection of utilitarian design materials which are similarly limited by the exemption in South Africa by s 15(3A) of the Copyright Act.

The exemptions also reflect some of the primary concerns with respect to the copyright monopoly in computer programs. First, the exemptions recognize that the method of storage of a program is transient and may easily be interfered with. A lawful user should therefore be allowed to make at least one back-up copy allowing it to restore the original program. There is no apparent reason why this approach should be limited to private or personal use, because it may effectively require a business to repurchase a licence for the program on each occasion of interference with its installed copy.

Secondly, the right of a lawful user to correct errors reflect the concern that a user may purchase a licence to a computer program that does not function properly, but copyright prevents such user from correcting the errors in the program that would render it fully functional. Thirdly, the exemption for reverse engineering recognizes that the ideas and functional elements of a computer program should not be monopolized.

Finally, the exemption for interoperability recognizes that it would unduly restrict competition if the copyright monopoly prevented all decompilation,<sup>86</sup> because it would prevent development of computer programs able to interoperate or function in conjunction with an existing program. It should be noted once again that it requires time and effort for computer users to familiarize themselves with computer programs. Such time and effort involve cost considerations for computer users, making it difficult for such users to change to a new program. Once a computer program is thus established in the market, it is extremely difficult, if not impossible, to displace.<sup>87</sup> Competitors of the copyright holder of such an established program will thus tend to develop programs that work in conjunction with the established program rather than attempt to compete directly with it.

### *Principles of infringement*

The locus classicus for copyright infringement in South African law remains *Galago Publishers (Pty) Ltd v Erasmus*.<sup>88</sup> Corbett JA, relying on English law,<sup>89</sup> held the test for infringement to be as follows:

'[I]n order for there to have been an infringement of the copyright in an original work it must be shown (i) that there is sufficient objective similarity between the alleged infringing work and the original work, or a substantial part thereof, for the former to be properly described, not necessarily as identical with, but as a reproduction or copy of the latter; and (ii) that the original work was the source from which the alleged infringing work was derived, i.e. that there is a causal connection between the original work and the alleged infringing work . . .'<sup>90</sup>

The second leg of the test of Corbett JA is relatively uncontroversial. It is recognized that direct evidence of the causal connection is often difficult to find, but the courts have consistently held that a causal connection has to be proven on a balance of probabilities in the light of all the relevant

<sup>86</sup> Since it would infringe on the exclusive adaptation right.

<sup>87</sup> For example, the Microsoft Windows operating system.

<sup>88</sup> 1989 (1) SA 276 (A).

<sup>89</sup> *Francis Day & Hunter Ltd v Bron* [1963] Ch 587.

<sup>90</sup> At 280.

circumstances, including direct evidence, opportunity to access the original work, and the objective similarities between the original work and the alleged infringing work.<sup>91</sup> Similarities in respect of unique, arbitrary or non-standard features, and similar mistakes or redundant code would be more convincing evidence of a causal connection than standard or commonplace features.<sup>92</sup>

The first leg of the test of Corbett JA is however problematic. Its wording has led to subsequent case law evaluating substantiality by not only looking at the similarities between the original work and the alleged infringing work, but also the dissimilarities.<sup>93</sup> This approach is unfortunate and inconsistent with the Copyright Act, which prohibits certain acts in respect of a substantial part of the *original* work only and thus prevents derivation rather than the creation of confusing or deceptive similarities in appearance.<sup>94</sup> In *Designers Guild Ltd v Russell Williams (Textiles) Ltd*<sup>95</sup> Lord Millet addresses the same problem encountered in the English courts, and his approach deserves to be quoted in full:

‘The Court of Appeal began by making a visual comparison of the two designs. Their initial reaction was that it did not look as if the defendants’ design involved the copying of a substantial part of the copyright work. As Morritt LJ put it at para 30: “On the broadest level they just do not look sufficiently similar. . .” [b]ut I think that the Court of Appeal erred in principle in the approach which they adopted. In particular, I think that they misunderstood the function of a visual comparison of the two works in a case concerned with artistic copyright and the stage at which such a comparison should be undertaken.

It must be borne in mind that this is an action for infringement of copyright. It is not an action for passing-off. The gist of an action for passing off is deceptive resemblance. The defendant is charged with deceiving the public into taking his goods as and for the goods of the plaintiff. A visual comparison of the competing articles is often all that is required. If the overall impression is that “they just do not look sufficiently similar” then the action will fail. An action for infringement of artistic copyright, however, is very different. It is not concerned with the appearance of the defendant’s work but with its derivation. The copyright owner does not complain that the defendant’s work resembles his, his complaint is that the defendant has copied all or a substantial part of the copyright work. The reproduction may be exact or it may introduce deliberate variations, involving, for example, altered copying or colourable imitation as it is sometimes called. Even where the copying is exact, the defendant may incorporate the copied features into a larger work, much and perhaps most of which is original or derived from other sources. But while the copied features must be a substantial part of the copyright work, they need not form a substantial part of the defendant’s work. Thus the overall appearance of the defendant’s work may be very different from the copyright work, but it does not follow that the defendant’s work does not infringe the plaintiff’s copyright.

The first step in an action for infringement of artistic copyright is to identify those features of the defendant’s design which the plaintiff alleges have been copied from the copyright work. The court undertakes a visual comparison of the two designs, noting the similarities and the differences. The purpose of the examination is not to see whether the overall appearance of the two designs is similar, but to judge whether the particular similarities relied on are sufficiently close, numerous or extensive to be more likely to be the result of copying than of coincidence. It is at this stage that similarities may be disregarded because they are commonplace, unoriginal, or consist of general ideas. If the plaintiff

<sup>91</sup> *Dexion Europe Ltd v Universal Storage Systems (Pty) Ltd* 2003 (1) SA 31 (SCA). For the position in England, see *IBCOS Computers Ltd v Barclays Mercantile Highland Finance* supra note 14 at 296–301. For a contrasting position in the United States, see *Computer Associates International Inc v Altai Inc* supra note 21, where it was held that causal connection is proven by either direct evidence or access and substantial objective similarity.

<sup>92</sup> *Jacana Education (Pty) Ltd v Frandsen Publishers (Pty) Ltd* 1998 (2) SA 965 (SCA), *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14 at 297–301.

<sup>93</sup> See for example *Jacana Education (Pty) Ltd v Frandsen Publishers (Pty) Ltd* supra note 92.

<sup>94</sup> Section 1(2A).

<sup>95</sup> 2001 FSR 11 (HL).



demonstrates sufficient similarity, not in the works as a whole but in the features which he alleges have been copied, and establishes that the defendant had prior access to the copyright work, the burden passes to the defendant to satisfy the judge that, despite the similarities, they did not result from copying. Even at this stage, therefore, the inquiry is directed to the similarities rather than the differences. This is not to say that the differences are unimportant. They may indicate an independent source and so rebut any inference of copying, but differences in the overall appearance of the two works due to the presence of features of the defendant's work about which no complaint is made are not material.

Once the judge has found that the defendants' design incorporates features taken from the copyright work, the question is whether what has been taken constitutes all or a substantial part of the copyright work. This is a matter of impression, for whether the part taken is substantial must be determined by its quality rather than its quantity. It depends upon its importance to the copyright work. It does not depend upon its importance to the defendants' work, as I have already pointed out. The pirated part is considered on its own and its importance to the copyright work assessed. There is no need to look at the infringing work for this purpose.<sup>96</sup>

This approach of Lord Millet can apply equally to all other types of works, including computer programs. It is clear that the order of the two legs of the test of Corbett JA in *Galago Publishers* should be reversed. In the first place, it is necessary to determine which parts of the alleged infringing work have been causally derived from the original work and, once that is established, the court must decide if the totality of those parts forms a substantial part of the original copyright work.<sup>97</sup>

Deciding whether the parts of a work which have been found to be reproduced embody a substantial part of the original work is probably one of the most difficult questions in copyright law. In *Galago Publishers (Pty) Ltd v Erasmus*<sup>98</sup> Corbett JA refers with approval to the oft-quoted English judgment of Lord Reid in *Ladbroke (Football) Ltd v William Hill (Football) Ltd*<sup>99</sup> and holds that substantiality 'depends much more on the quality than on the quantity' of what has been taken. These words have been repeated with monotonous regularity by the South African courts, but they have been less than clear in stating what the word 'quality' actually relates to.<sup>100</sup>

The English courts recently addressed this issue. In *Designers Guild Ltd v Russell Williams (Textiles) Ltd*<sup>101</sup> Lord Scott quoted with approval the test proposed by Laddie, Prescott & Vittoria<sup>102</sup> which asks: 'Has the infringer incorporated a substantial part of the independent skill, labour etc. contributed by the original author in creating the copyright work. . .?'

In *Newspaper Licensing Agency Ltd v Marks & Spencer*<sup>103</sup> Lord Hoffmann described it in the following way:

'But what quality is one looking for? The question, as it seems to me, must be answered by reference to the reason why the work is given copyright protection. In literary copyright, for example, copyright is

<sup>96</sup> At 34–41.

<sup>97</sup> See also Lord Hoffmann in *Designers Guild Ltd v Russell Williams (Textiles) Ltd* supra note 95 at 17–22. 1989 (1) SA 276 (A) at 285.

<sup>98</sup> [1964] 1 All ER 465 (HL).

<sup>100</sup> See for example *Fax Directories (Pty) Ltd v SA Fax Listings CC* 1990 (2) SA 164 (D), from which it is apparent that the court regards quality as relating to the monetary value of the parts taken.

<sup>101</sup> Supra note 95 at 64.

<sup>102</sup> *The Modern Law of Copyright and Designs* 2 ed (1995) para 2–108.

<sup>103</sup> [2002] RPC 4.

conferred (irrespective of literary merit) upon an original literary work. It follows that the quality relevant for the purposes of substantiality is the literary originality of that which has been copied . . . [i]t is in this context that one must ask whether there has been copying of sufficient of the relevant skill and labour to constitute a substantial part . . .'<sup>104</sup>

From these decisions it is thus clear that the quality of a part of a copyright work relates to the skill, labour and judgement expended in making or creating such part of the work that contributes to making the copyright work as a whole original.<sup>105</sup> It should also be the correct type of skill, labour and judgement, in that in a literary work, for example, it contributes literary originality (as opposed to, for example, artistic originality).<sup>106</sup> Furthermore it must be the type of labour, skill and judgement which gives the work 'a new and original character'<sup>107</sup> or 'impart[s] to the product some quality or character which the raw material did not possess, and which differentiates the product from the raw material'.<sup>108</sup>

Lord Hoffmann in *Newspaper Licensing Agency*<sup>109</sup> had no hesitation in applying these principles to a published edition and they should be equally applicable to computer programs in the South African context.<sup>110</sup> To some extent the Supreme Court of Appeal seems to appreciate that quality relates to labour, skill and judgement when it found sixty-three lines of program code out of several thousand lines to be a substantial part, since the lines were copied because the programmer of the infringing program 'found it too difficult to write them himself'.<sup>111</sup> The question therefore becomes: does the totality of the parts of the computer program that was taken for use in the alleged infringing program represent a substantial part of the right type of labour, skill and judgement expended to make the first program original?<sup>112</sup>

It is often said that there is no copyright in ideas, thoughts or facts, but only in the expression thereof, and consequently that the copying of expression is required for copyright infringement. Whereas this statement

<sup>104</sup> At 19.

<sup>105</sup> This is not a new proposition as can be seen from the words from Lord Pearce in *Ladbroke (Football) Ltd v William Hill (Football) Ltd* supra note 99 when he states: 'Whether a part is substantial must be decided by its quality rather than its quantity. The reproduction of a part which by itself has no originality will not normally be a substantial part of the copyright and therefore will not be protected.'

<sup>106</sup> See *Interlego v Tyco* 1988 (3) All ER 949, and Lord Hoffmann in *Designers Guild Ltd v Russell Williams (Textiles) Ltd* supra note 95 at 25 and *Newspaper Licensing Agency Ltd v Marks & Spencer Plc* supra note 103 at 19–21.

<sup>107</sup> *Northern Office Micro Computers (Pty) Ltd v Rosenstein* supra note 26 at 130.

<sup>108</sup> *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 (ChD) 132.

<sup>109</sup> [2002] RPC 4.

<sup>110</sup> The applicability of these principles in the South African context is also supported by Corbett JA in *Galago Publishers (Pty) Ltd v Erasmus* supra note 88 at 284 when he quotes the following words with approval from *Ravenscroft v Herbert* [1980] RPC 193: 'Copyright protects the skill and labour employed by the plaintiff in production of his work.'

<sup>111</sup> Per Streicher JA in *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* (SCA) supra note 11 para 45. The Court also implies that quality may relate to the contribution made to the functioning of the program by the relevant sections of code when it says that '[t]hese components were clearly considered to be a valuable ingredient of the program by both [the applicant] and the respondents'. Such an approach to 'quality' is clearly inconsistent with the English decisions referred to above.

<sup>112</sup> In the case of the entrepreneurial works, such as a computer program, it could be argued that such labour, skill and judgment is not necessarily expended by the author, because the author is often not the person actually making the work. See the text to note 51.

generally holds true for copyright in the United States,<sup>113</sup> the same cannot be said for England<sup>114</sup> or South Africa. Corbett JA<sup>115</sup> rightly criticizes this statement as an over-simplification by referring to English authorities<sup>116</sup> which state:

'Ideas, thoughts and facts merely existing in a man's brain are not "works", and in that form are not within the Copyright Act; but once reduced to writing or other material form the result may be a work susceptible to protection. Given that there exists a good copyright in a work, the law does not protect a general idea or concept which underlies the work, nor any one fact or piece of information contained therein. However, a more detailed collection of ideas, or pattern of incidents, or compilation of information may amount to such a substantial part of the work that to take it would be an infringement of the copyright, although expressed in different language or other form, it being a matter of fact and degree whether the dividing line has been impermissibly crossed.'

The English<sup>117</sup> and South African<sup>118</sup> courts have also been much more inclined to protect the merely functional than their United States<sup>119</sup> counterparts, even where the expression protected was effectively the only form in which the idea could be expressed.<sup>120</sup> The functional nature of a work has even been allowed to influence the evaluation of substantiality in England, in that it was held that the substantiality of the parts reproduced from an engineering drawing was to be evaluated by an engineer who would clearly be able to recognize their functional importance despite those parts being visually insignificant to a layman.<sup>121</sup>

### *Infringement of computer programs*

South Africa's only judgment of any significance on the evaluation of the meaning of a 'substantial part' in respect of computer programs is the case of *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd*,<sup>122</sup> where the issue was dealt with in a rather perfunctory manner by the Supreme Court of

<sup>113</sup> Following *Baker v Selden* 101 US 99 (1879). See also *Rosenthal v Kalpakian* 446 F 2d 738 (1971).

<sup>114</sup> See the judgment of Lord Hoffmann in *Designers Guild Ltd v Russell Williams (Textiles) Ltd* supra note 95 23–26; *IBCO Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14 at 301–2.

<sup>115</sup> *Galago Publishers (Pty) Ltd v Erasmus* supra note 88 at 283–4.

<sup>116</sup> Laddie, Prescott & Vittoria op cit note note 102 at 33.

<sup>117</sup> See for example the protection of a grid layout for a competition in *Express Newspaper v Liverpool Daily Post* [1985] 3 All ER 680; and the protection of computer data file definitions in *IBCO Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14.

<sup>118</sup> See for example, the protection of a list of gasket numbers in *Payen Components SA Ltd v Bovic Gaskets CC* supra note 31; a list of telephone numbers in *Fax Directories (Pty) Ltd v SA Fax Listings CC* supra note 100, a directory of vehicle specifications in *Metro Polis t/a Transactive (Pty) Ltd v Naidoo t/a African Products* 759 JOC (T) and a compilation of contact details in *Human Sciences Research Council v Dictum Publishers (Pty) Ltd* 804 JOC (T). Contrast *Waylite Diaries CC v First National Bank Ltd* 1995 (1) SA 645 (A) where copyright for a diary was refused, because it was held to be commonplace in its entirety.

<sup>119</sup> *Computer Associates International Inc v Altai Inc* supra note 21; *Feist Publications v Rural Telephone* 111 S Ct 1282 (1991).

<sup>120</sup> See also *Data Access Corp v Powerflex Services (Pty) Ltd* supra note 10 at 24–5 in which the Australian High Court recognizes that the protection of a computer program requires the protection of the functional and sees it as a departure from the traditional principles of copyright stated in *Autodesk Inc v Dyason* supra note 28 at 582 to be 'when the expression of an idea is inseparable from its function, it forms part of the idea and is not entitled to the protection of copyright'.

<sup>121</sup> *Billhofer Maschinenfabrik GmbH v TH Dixon & Co Ltd* [1990] FSR 105 (ChD). For a contrary approach see *Johnstone Safety Ltd v Peter Cook (Int) plc* [1990] FSR 161 (CA).

<sup>122</sup> Supra note 11.

Appeal.<sup>123</sup> Judges worldwide tend to avoid deciding the issue, looking for short cuts or leaving it to experts to decide. The shortcut used most often is the 'look and feel approach' in terms of which a finding is made as to the reproduction of the code of a computer program based on the similarities of the output data of the programs.<sup>124</sup> Another shortcut used by the courts is to say that any part of the code of a computer program is substantial, because without it the program would not be able to function correctly.<sup>125</sup>

Two distinctly opposite approaches to copyright infringement in computer programs emerge from the United States<sup>126</sup> and England,<sup>127</sup> despite an early attempt to import the United States approach into English law.<sup>128</sup> The conflict between the two approaches derives by and large from the differences in protection granted to ideas and functional elements of works as described above.

The modern United States approach<sup>129</sup> to the determination of substantiality originates from *Computer Associates International Inc v Altai Inc*<sup>130</sup> and is known as the 'AFC-test', where the acronym stands for Abstraction — Filtration — Comparison. In terms of this test the court first breaks down the original program into its constituent structural parts at the appropriate different levels of abstraction. The court then separates and removes all the parts of the original program not worthy or suitable for copyright protection and thus not suitable for being considered for the purposes of evaluating substantiality. Finally, the remaining kernel of protectable expression or 'golden nugget' is compared to the alleged infringing work to determine whether or not a substantial part thereof was taken.

<sup>123</sup> Streicher JA found that 63 lines of code from a program containing several thousand lines were a substantial part because they were qualitatively important. He based his finding of quality on the fact that the programmer of the infringing program found the lines too difficult to write himself and because they were 'considered to be a valuable ingredient of the program' by all parties concerned. (See para 45 of the judgment.)

<sup>124</sup> This approach is rejected in *Haupt t/a Sofcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19 at 411. See also *Thrustcode Ltd v WW Computing Ltd* [1983] FSR 502 at 505 where Megarry V-C puts it as follows: '[W]here, as here, the claim is to copyright in the program itself, the results produced by operating the program must not be confused with the program in which the copyright is claimed. If I may take an absurdly simple example, 2 and 2 make 4. But so does 2 times 2, or 6 minus 2, or 2 percent of 200, or 6 squared divided by 9, or many other things. Many different processes may produce the same answer and yet remain different processes that have not been copied one from another.'

<sup>125</sup> In *Cantor Fitzgerald International v Tradition (UK) Ltd* supra note 108 at 131 Pumfrey J rejects this type of argument made in *Autodesk Inc v Dyason* supra note 28 and *Autodesk Inc v Dyason* [No 2] [1993] RPC 259 (HC of Aus) since overruled in *Data Access Corp v Powerflex Services (Pty) Ltd* supra note 10 at 77–87.

<sup>126</sup> *Computer Associates International Inc v Altai Inc* supra note 21; *Gates Rubber Co v Bando Chemical Industries Ltd* 9 F 3d 823.

<sup>127</sup> *IBCO Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14; *Cantor Fitzgerald International v Tradition (UK) Ltd* supra note 108.

<sup>128</sup> *John Richardson Computers v Flanders* [1993] FSR 497.

<sup>129</sup> Older United States cases tended to follow the much criticized decision in *Whelan Associates v Jaslow Dental Laboratory Inc* 797 F 2d 1222 at 1236, holding that '[t]he purpose or function of a utilitarian work would be the work's idea and everything that is not necessary to that purpose or function would be expression of the idea. Where there are various ways of expressing an idea, then the particular means chosen is not necessary to the purpose; hence there is expression, not idea.' This clearly provides very wide copyright protection for computer programs. The *Whelan* approach was widely criticized in the United States as being anti-competitive in that it granted protection similar to a patent.

<sup>130</sup> Supra note 21.

The different levels of abstraction have been held to be the program's main purpose, the program structure or architecture, the program modules, the program's algorithms and data structures, the source code and the object code.<sup>131</sup> Whereas the program's main purpose would clearly be a general idea that is not protectable by copyright, the coding of the program would be an expression that could, in principle, be protectable by copyright. The protection of levels of abstraction other than the source or object code is more difficult to assess. These so-called 'non-literal elements' of the program<sup>132</sup> are often described as the program's structure, sequence and organization and can include things such as the general program structure as it may appear in a flow chart, the organization of intermodular relationships, the parameters used and macro command structures.<sup>133</sup> The 'look and feel' of the program could also form part of the non-literal elements of the program, in particular, in the structure, sequencing and organisation of the user interfaces. However, as remarked in *Computer Associates*,<sup>134</sup> the audiovisual displays forming part of the user interfaces can be regarded as distinct works and their appearance, in particular, should thus not form part of the protectable elements of the computer program itself.

The purpose of filtration is to ensure 'that non-protectable technical expression remains in the public domain for others to use freely as building blocks in their own work'.<sup>135</sup> For this reason the courts eliminate certain parts of computer programs from the scope of protection, namely ideas, processes, facts, public domain information, merger material, scènes à faire material, and other unprotectable elements suggested by the particular facts of the program under examination.<sup>136</sup> Merged material is expression of an idea that can be expressed in a very limited number of ways. In such cases the 'merger doctrine' dictates that the expression merges with the idea and becomes unprotectable.<sup>137</sup> Scènes à faire material is expression that is either rudimentary, commonplace, indispensable, or standard to the idea being expressed or are otherwise dictated by external factors.<sup>138</sup> These parts of the expression are simply equated to ideas and are therefore not protectable.<sup>139</sup>

Finally, once the court has filtered out all the unprotectable elements only a kernel of protectable expression remains that is compared to the alleged infringing work to determine whether or not a substantial part thereof was

<sup>131</sup> *Gates Rubber Co v Bando Chemical Industries Ltd* supra note 126.

<sup>132</sup> For a more detailed discussion on these elements see Tumbraegel & De Villiers op cit note 14 and Julian Velasco 'The copyrightability of non-literal elements of computer programs' (1994) 94 *Columbia LR* 242.

<sup>133</sup> *Computer Associates International Inc v Altai Inc* supra note 21.

<sup>134</sup> *Ibid.*

<sup>135</sup> *Ibid* at 721.

<sup>136</sup> *Gates Rubber Co v Bando Chemical Industries Ltd* supra note 126.

<sup>137</sup> *Morrissey v Proctor & Gamble*, 379 F 2d 675, *Lotus Development Corp v Paperback Software International*, 740 F Supp 37.

<sup>138</sup> *Atari Inc v North American Philips Consumer Electronics Corp* 672 F 2d 607 (7th Cir) (1982), *Reed-Union Corp v Turtle Wax Inc* 77 F 3d 909 (7th Cir) (1996), *Williams v Crichton* 84 F 3d 581 (2nd Cir) (1996).

<sup>139</sup> *Whelan Associates v Jaslow Dental Laboratory Inc* supra note 129, Donald S Chisum & Michael A Jacobs *Understanding Intellectual Property Law* (1992) 4–30.

taken. The United States approach is clearly aimed at fostering competition and furthering development by giving limited protection to functional expression.<sup>140</sup>

The approach of the English courts to the evaluation of substantiality differs dramatically from that under United States law. The seminal case is *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd*<sup>141</sup> in which Jacob J rejected the United States approach earlier adopted by Ferris J in *John Richardson Computers Ltd v Flanders and Chemtec Ltd*<sup>142</sup> in the following terms:

'For myself I do not find the route of going via United States law particularly helpful. As I have said, United Kingdom copyright cannot prevent the copying of a mere general idea but can protect the copying of a detailed "idea". It is a question of degree where a good guide is the notion of over borrowing of the skill, labour and judgment which went into the copyright work.'<sup>143</sup>

Jacob J continued by approving the statement of Ferris J that '[c]onsideration is not restricted to the text of the code' and confirmed that the program structure and design features of the program could also be protected.<sup>144</sup> Jacob J likened these non-literal elements of a computer program to the plot of a novel.

In *Cantor Fitzgerald International v Tradition (UK) Ltd*<sup>145</sup> Pumfrey J confirms the approach of Jacob J and puts the test for substantiality as follows:

'The closest analogy to a plot in a computer program lies perhaps in the algorithms or sequences of operations decided on by the programmer to achieve his object. But it goes wider. It seems to be generally accepted that the "architecture" of a computer program is capable of protection if a substantial part of the programmer's skill, labour and judgment went into it. . . . So in my judgment the substantiality of what is taken has to be judged against the collection of modules viewed as a whole. Substantiality is to be judged in the light of the skill and labour in design and coding which went into the piece of code which is alleged to be copied.'<sup>146</sup>

Pumfrey J recognizes that the term 'architecture' is vague, but nonetheless states that it could include the functional program structure and intermodular relationships within the computer program at a high level of abstraction.

Like the United States courts, the English courts therefore protect certain non-literal elements of a computer program, including the structure, sequence and organization of the program, by protecting such elements as detailed concepts incorporated in the expression. In contrast to the United States, though, the English courts do not limit copyright protection for purely functional elements of the program code through the use of doctrines such as merger and scènes à faire.

Potentially, some limitation of the copyright protection for computer programs can be achieved by focusing on the type of skill, labour and judgement that is protected by copyright under English law. In particular,

<sup>140</sup> For example, standard programming module or the definition of an interface for a program or for the data files used by a program would be extremely difficult to protect under United States law. In contrast see *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd* supra note 14.

<sup>141</sup> Supra note 14.

<sup>142</sup> [1993] FSR 497 (ChD).

<sup>143</sup> At 302.

<sup>144</sup> These included the definitions of data files as used by the file transfer programs of the defendant.

<sup>145</sup> Supra note 108.

<sup>146</sup> At 134.

mere information, facts or other commonplace materials are generally not protected by copyright under English law, because they are not considered original.<sup>147</sup> The taking of such materials would thus not usually amount to a substantial taking from the copyright work.<sup>148</sup> However, the fact that something is functional does not necessarily mean that it is commonplace under English law and it is this difference which leads to the protection of data file definitions and program interfaces by copyright to the detriment of further development and competition in the marketplace.

Evaluating the substantiality of a part of a computer program under South African law has only been addressed by our courts in a perfunctory manner, as previously stated,<sup>149</sup> and as a result all that is left is to speculate on a proposed approach. This is made more difficult by the fact that the South African legislature has chosen to protect computer programs as sui generis works, since foreign law invariably protect computer programs as literary works.<sup>150</sup> It is accepted that copyright only protects relevant effort and that the relevancy of such effort depends on the specific type of work for which protection is sought.<sup>151</sup> It could thus be argued that the relevant skill, labour and judgement that are protected by copyright differ between computer programs and literary works. Consequently, all foreign case law relating to computer programs could in theory be rejected by our courts as being inapplicable in the South African context. However, copyright should in principle protect the intellectual effort spent in making copyright works and our courts have given indications that such effort spent in the creation of a computer program will be protected.<sup>152</sup>

As a result of the historical links and the similarities between the relevant legislation of the two countries, the tendency of South African courts has been to follow English law and the statements of Corbett JA in *Galago Publishers (Pty) Ltd v Erasmus*<sup>153</sup> show that our courts are likely to protect more than just the literal code of a computer program, and ought to extend copyright protection to the non-literal elements such as structure, sequence and organisation of the program, being a 'detailed collection of ideas' worthy of protection.

South African law also recognizes that commonplace materials are not worthy of protection,<sup>154</sup> but our courts have tended to grant even wider

<sup>147</sup> See Lord Hoffmann in *Designers Guild Ltd v Russell Williams (Textiles) Ltd* supra note 95 at 25

<sup>148</sup> It may for example be argued that some standard programming modules do not warrant protection since they are commonplace.

<sup>149</sup> See note 123.

<sup>150</sup> It is worth noting that the South African legislature has not complied with art 10 of the TRIPS Agreement, which makes the protection of computer programs as literary works obligatory for all signatories.

<sup>151</sup> See note 106.

<sup>152</sup> In *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* (C) supra note 19 at 412, the originality of a computer program depended on the skill and labour expended to create it. See also *Haupt t/a Softcopy v Brewers Marketing Intelligence* (SCA) supra note 11 paras 24 and 35.

<sup>153</sup> Supra note 88.

<sup>154</sup> *Waylite Diaries CC v First National Bank Ltd* 1995 supra note 118.



protection to mere information and facts than the English courts.<sup>155</sup> Our courts are thus less likely to limit copyright protection on a purely functional element of a computer program than the English courts, even if such element is the only way of expressing something. Unfortunately such an approach will tend to reduce competition in the software industry and to stifle further development and innovation. It is thus likely that the legislature will have to be called upon to address these difficulties by creating additional exemptions from copyright infringement in computer programs.<sup>156</sup>

## CONCLUSIONS

South African courts, like their counterparts elsewhere in the world, are still grappling with the application of copyright law to computer programs and, as this article has attempted to show, a number of problems still exist. Most of these problems can be overcome through the correct use of traditional copyright principles. However, the utilitarian nature of computer programs creates additional difficulties that traditional copyright principles under South African law will struggle to resolve. Our law, like English law, does not differentiate between the utilitarian and the artistic or aesthetic, nor do we have doctrines similar to those found in United States law that can be used to eliminate some utilitarian parts of copyright works from protectable expression. As a result South African copyright law can be used to stifle competition in the software industry and to prevent further innovation or development, particularly of programs that interoperate with already existing programs. This problem, as it relates to utilitarian design materials, was clearly recognized by the legislature when it enacted s 15(3A) of the Copyright Act,<sup>157</sup> which grants an exemption from infringement in respect of such materials. Similar exemptions, which specifically cater for the unique difficulties relating to computer programs, are still lacking in South African copyright law — a deficiency that requires urgent attention.<sup>158</sup>

<sup>155</sup> See note 110.

<sup>156</sup> Standard programming modules may be adjudged to be commonplace and thus not protectable following *Waylite Diaries CC v First National Bank Ltd* supra note 118 and *Jacana Education (Pty) Ltd v Frandsen Publishers* supra note 92.

<sup>157</sup> The English Copyright, Designs and Patents Act 1988 addresses the same issue rather more comprehensively in ss 51 to 53 and ss 213 to 235.

<sup>158</sup> In this regard it is clear that the exemptions currently incorporated in the English Copyright, Designs and Patents Act 1988 are probably not entirely adequate, but could nonetheless be a useful starting position.